

NOTES

1. Papers selected for inclusion in General Sessions will be available at the Conference in the following official languages of the United Nations: English, French, Russian and Spanish.
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GEOLOGICAL SURVEY AND EVALUATION OF MINERAL RESOURCES IN UNDER-DEVELOPED COUNTRIES

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a) Specific natural conditions

1) Most of the economically under-developed countries which passed through a long period of colonial rule, have considerable mineral resources. Assistance in the survey and evaluation of these resources is given by the socialist countries within the scope of economic agreements on assistance to these countries.

It is granted largely in the form of expert cooperation of specialists who direct or help in geological research, in training specialists and in designing and constructing mines.

2) Geology is of special importance for the development of economically under-developed countries because it is the first condition for development of the key branches of economy and technology. Geological research and survey provide minerals for the most important branches of industry which, of their production exceeds local consumption, are often a very advantageous means for international trade. Geological surveys ensure the first prerequisites for the utilization of rivers as a source of power and for irrigation, the basis for the utilization of ground water and providing raw materials for building.

3) Insufficient knowledge of the geological structure of vast territories, progress in geology by the advanced countries and the new attitude to aid to under-developed countries arising from the mission of the United Nations, calls for a new method of geological research.

Only general knowledge is available of the geological structure of the under-developed countries. No modern systematic geological mapping was done in many of these countries. For this reason initial geological survey in the form of aid described above is at first

usually conducted by expanding old and established deposits or confirming other mineral deposits. This is a quick way of obtaining the basis for planning new or extending existing mines and processing plants.

It would, however, not be corrected to concentrate only on prospecting for the various raw materials according to their immediate possibilities on the world market and on supplementing knowledge on deposits which are partly explored. A systematic complex survey and geological mapping of whole areas should be started at the same time with a view to the most urgent needs of the economy. Very good and often unexpected results are achieved by this system of work.

Geological survey is often complicated by the difficult accessibility of the terrain and a lack of topographical information. As the result basic topographical and subsequent geological mapping is usually very costly. In spite of this, however, even in the first phase, work should be aimed at systematic geological-topographical mapping of the entire area under exploration, which is essential for further geological survey, projecting of new sources of minerals and for all economic and technical considerations.

In this all available technical means which speed up and make regional geological exploration and mapping more precise should be used as widely as possible, especially aviation (aero-geophysical measurements, aero-photography, etc.)

A large number of under-developed countries have some specific geological difficulties which complicate exploration of mineral deposits. The first is the extent of wind-swept earth and sand and the dense vegetation. Specific utilization of bio-chemical and metalometric methods should be elaborated for different cases.

A thorough geological survey requires material and technical, especially mechanical equipment, of the groups of geologists. The engineering industry in those countries is usually not at a level where repairs or manufacture of spare parts could be undertaken without holding up research work. For this reason there must be adequate spare parts for the machines used.

In the scope of systematic regional geological research it is useful to ensure engineering and geological research of the utilization of rivers, especially for power and irrigation projects. Where the necessary material is lacking it is appropriate to start hydro-geological and geomorphological research of the main rivers.

b) Political and economic conditions

1) The main principle in organizing assistance in geological exploration is the ratio and position of foreign experts. It is not effective or correct, especially with big expeditions, to select only foreign experts for leading the expeditions. On the contrary, an effort should be made to bring about cooperation in research teams composed of both foreign specialists and local experts from the point of view of the nationality policy. In this of course the basic line, i.e. that the group is capable of executing even the most urgent tasks of complex research in a given time should be observed.

The work of the teams should be directed so that research work may be gradually transferred to local experts and foreign participation confined to regular and later to only occasional consultation.

2) The observance of these principles makes it necessary to ensure education (school and post-graduate) of local workers within a required period and to the required extent; first at foreign and later at local schools and research institutes. Basic specialized schooling of the local research workers concerns geologists as well as technicians. Schooling is sometimes combined with great difficulties, especially from the point of view of expert translation in the local language. Very often the translator is not a specialist and the lecturer does not know the local language, terminology is often lacking in the language concerned, so that the quality of the translation is not guaranteed. In spite of this however, this schooling must be carried out even at this risk in order to make assistance in geological research successful. Our experience is that thorough schooling of a small number of the most intelligent of the local collaborators is the most successful; they then conduct courses on a broader scale. It is more advantageous because with a small group much closer personal contact between the lecturer and his students and detailed explanations are possible.

3) The results of geological research should be put into practice by technical means in the construction of the necessary mining, washing and grading and processing installations in order that a maximum part of the production processes dependent on minerals be

performed in the country in which they are found within the shortest possible time.

c) Experiences of The Czechoslovak Socialist Republic in the field of Geological Research in The Vietnamese Democratic Republic

In conclusion we cite the experience of the Czechoslovak Socialist Republic in extending assistance to the Vietnamese Democratic Republic, characterized by certain conditions.

1) Close attention should be devoted to specific local natural conditions which influence the choice of working methods and the effectiveness of the work. In the VDR, this was so with zinc-lead ores of special formation. The difficult geology and tectonics was clarified only after detailed geological research. In the Cho Dien basin, for instance, the French mining company did not know of the existence of large ore deposits over which we and they were literally walking in our expeditions. That was caused particularly by the dense tropical vegetation and by the fact that this type of ore formation in such large dimensions is not common. In all basins where Czechoslovakia helped Vietnamese geological exploration, ore had already been mined by French companies. Their purpose was to find the richest veins of those deposits. In consequence of inadequate geological supervision and sometimes wrong geological conclusions, some very rich sections remained unexploited in this way. That is why large deposits were newly confirmed even where according to old French reports, the deposits had already been exhausted. Some rich mines are thus so badly devastated by poorly planned mining that it will not be possible to work them again.

Because the former capitalist mining companies in the VDR did not have enough finances which would have enabled them to extract poor grade ore that can be processed economically today, the regular method of prospecting for new deposits can be applied. Only the richest zone of the deposit near the surface which had the maximum content of useful components was extracted.

2) The fundamental prerequisite for conducting geological research in under-developed countries is the principle "quick and cheap". That is why it is necessary that light and inexpensive types of research projects are chosen. Large ore deposits in the VDR were confirmed by means of picks and hand drills. This method and simultaneous geological mapping enabled the fulfillment of the

main task, i.e. to confirm the necessary deposits for the construction of a mine quickly and cheaply.

3) In view of the specific political situation in under-developed countries close cooperation with local political and economic authorities is necessary. As an example we mention the organization of people's prospecting in areas where deposits are likely to be found in the Vietnamese Democratic Republic. The population in the particular region were simply shown samples of ores and in cooperation with the local political authorities, popular prospecting was organized which yielded very good results. Economically, surveys organized in this manner were very effective; it should be added that wherever the people discovered indications of deposits, they would never have been reached by foreign specialists.

Close cooperation with local organizations in the VDR also proved successful. In the construction of a mine, the practice was adopted that the respective geological research station or section is directed by the local organization in close cooperation with the experts. Responsibility for successful geological research which at the onset is borne by the foreign specialists is gradually transferred to the local workers after their training.

The principle of cooperation between the Czechoslovak Socialist Republic and the Vietnamese Democratic Republic in geological research is to extend selfless aid and impart useful experience.

Assistance is extended in accordance with the requirements of the Vietnamese Democratic Republic and expert evaluation of the Czechoslovak specialists concerning the prospects of the various basins. All aspects of research and extracting mentioned in the report, i.e. the geological and economic conditions are carefully considered and preliminary elaboration and study of the deposits, and following consultation with the projecting organizations, proposed for exploration.

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